Advanced Fuel Cycle Initiative (AFCI):
MEGAPIE Experiment: Progress

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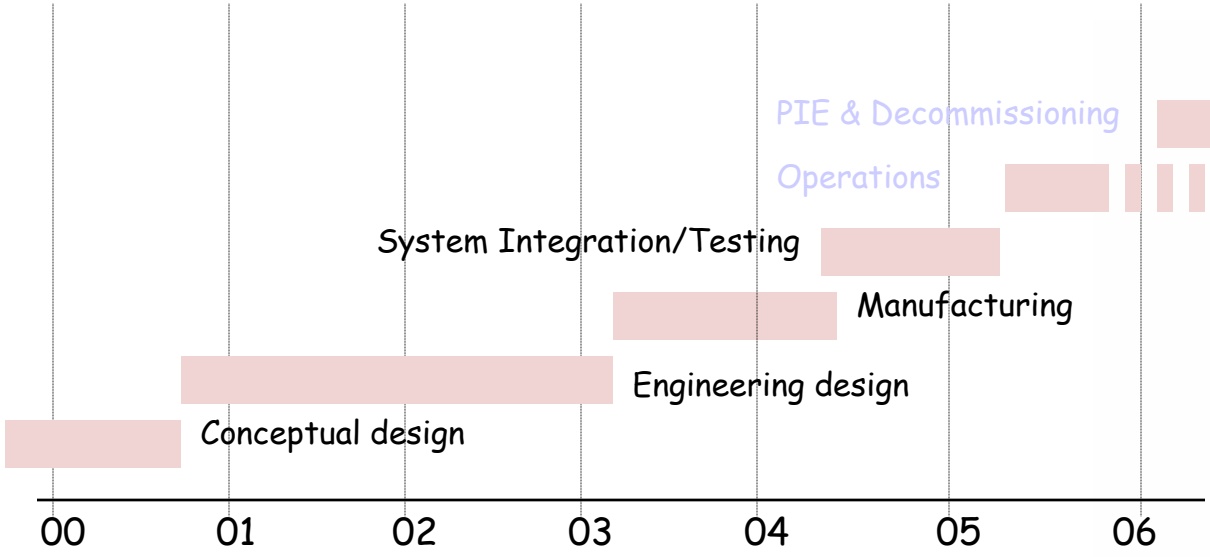
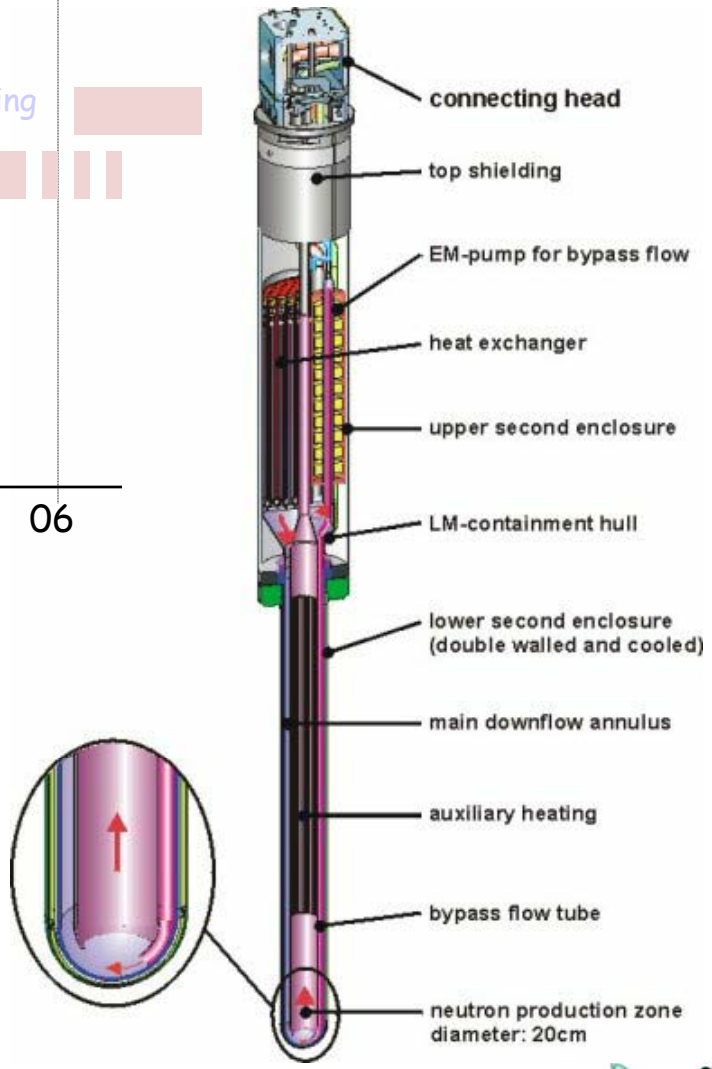
The MEGAPIE (MEGAwatt PIlot Experiment) is aimed at testing LBE spallation target technology at 1 MW beam power.



- MEGAPIE team is starting the target manufacturing
- Major issues:
  - Window cooling
  - Window lifetime determination
  - Window failure (safety)
  - Pump performance testing and heat exchanger design
  - Fill and drain system



We have raised our concerns on the MEGAPIE project officially during the technical review meeting in March.

- We are concerned that some of the design decisions and recent design simplifications made to accommodate the tight schedule demands may jeopardize the successful conclusion of the test.

- Our first priority is to start the test when we have a high confidence of success.
  - We question the value of meeting the schedule but completing either an inconclusive or, worse, an unsuccessful test.

- We are equally concerned with the status of the design in reference to remaining essential design activities.

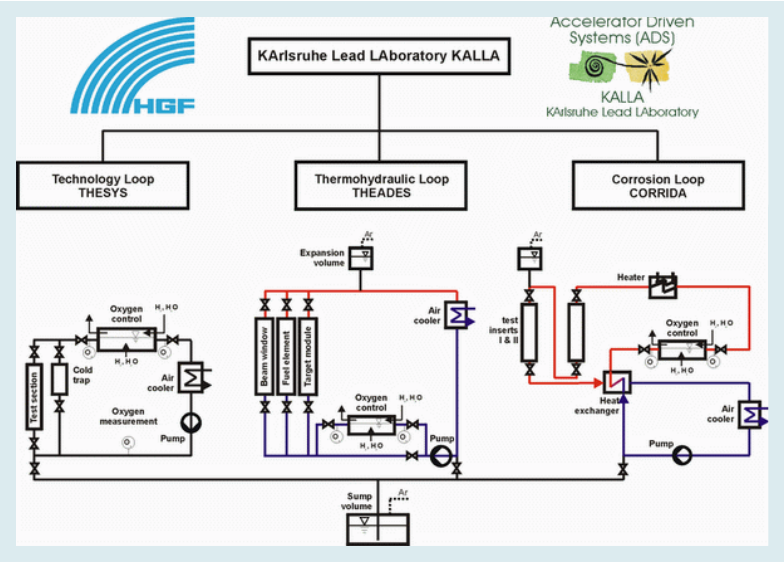
During the same technical review meeting, we made specific recommendations on each issue raised.

- We request that the issues raised in this presentation be addressed prior to and during the upcoming Steering Committee meeting, in parallel to
  - Carefully reviewing the MEGAPIE test objectives
  - Developing the Integral Test plan
  - Developing detailed separate effect test plans in areas recommended in this presentation
- The failure risk of achieving test objectives must be carefully evaluated and communicated to the partners.
- We would like to offer our assistance in resolving these issues when requested within the limitations of our resources.

We were not able to attend the Steering Committee meeting in June.

- Our recommendations were subsequently endorsed by the Technical Review Committee of MEGAPIE.
- Unfortunately, drain capability is not being considered any longer.
- Test plan and objectives are being worked
  - Shorter irradiation duration is being proposed (3 months ?)
- Nonetheless, MEGAPIE collaboration has been **VERY BENEFICIAL** to the U.S. program in the area of fundamental knowledge in LBE technology development and implementation.
  - OECD Working Group on LBE Handbook
    - CEA/CNRS (France)
    - DOE (USA)
    - ENEA-Brasimone (Italy)
    - FZK (Germany)
    - JAERI (Japan)
    - KAERI (S. Korea)
    - PSI (Switzerland)
    - SCK-CEN (Belgium)

MEGAPIE is the focal point for a very large research and engineering effort in Europe in spallation target development and LBE technology.



- MEGAPIE partners include:
  - SCK-CEN (Belgium)
  - CEA, CNRS (France)
  - FZK (Germany)
  - ENEA (Italy)
  - JAERI (Japan)
  - KAERI (S. Korea)
  - PSI (Switzerland)
  - DOE (USA)
  - *Negotiations with China Institute of Atomic Energy ongoing*

MEGAPIE Initiative

TECLA
LBE Technology and Corrosion Studies
• e.g, KALLA facility

STIP
Materials Irradiation

SPIRE
Structural properties of irradiated materials

LISOR
LBE-Metal Reactions under stress and proton irradiation

TERM
Thermal-hydraulic experiments with prototypic geometry.

In conclusion,

- We continue to be concerned about the success of the MEGAPIE target irradiation in SINQ (PSI)

- We believe the problems are not inherent to LBE targets but, rather, caused by
  - Special geometry of the SINQ accelerator and target station
  - Very aggressive schedule imposed on the project early on
    - PSI desire for a higher yield target.
  - Changes in project management half way through the development phase
    - Loss of Gunter Bauer as the project manager
  - Maintaining the proper balance between science and engineering in some areas.

- **However, in the area of technology development, MEGAPIE partnership benefited and continues to benefit the U.S. program considerably.**